FATAL SYPHILIS*†

BY

G. L. M. McELLIGOTT

St. Mary's Hospital, Paddington, London

The ultimate importance of a disease depends upon its power to shorten life. Potentially syphilis is a life-shortener of considerable importance and it is reasonable to suppose that during periods such as the late war and immediately afterwards, when the attack rate was high, many infected persons with minimal or even subminimal signs and symptoms, escape the early treatment that would insure them against the likelihood of later lethal effects.

It is neither necessary nor profitable to delve far back into history to discover the extent to which syphilis proved fatal in the distant past. Early in the 16th century it was recognized as a cause of abortion and infant mortality, though many of the " grave and far reaching " effects of the acquired disease seem to have remained unknown for over 200 years. In Great Britain, the disease was probably as widespread as it has ever been in the 18th and the 19th centuries. In those days the expectation of life was very low (35 years at birth in 1851), and though prenatal syphilis must have destroyed many infants in the first year of life, the number so killed was probably tiny compared to those who perished from infantile diarrhoea, pneumonia, and other diseases of dirt, malnutrition, and neglect. In like manner, the young man or woman who contracted syphilis must, until comparatively recently, have had a relatively poor chance of dying of the disease. The hazards of death in early and middle life were far greater than they are to-day and to name only one cause, pulmonary tuberculosis the " captain of the men of death ", must have claimed many candidates for future general paralysis, tabes, or cardiovascular disease, long before they had a chance to show signs of these conditions, still less to die of them.

Death from early acquired syphilis always seems to have been uncommon, and though all of us have memories of a few patients who seemed desperately ill in the secondary stage, very few of us have seen a death directly attributable to the infection.

In the 19th century, and indeed in the first three decades of the 20th, it was said with truth, that if one wanted to see the end results of syphilis, one must go to what used to be known as the workhouse hospitals. Here were the hopeless hemiplegias and paraplegias, the tabetic bladders with pyelonephritis, the multiple gummata of skin, bone, and mucous membrane, which though they healed under treatment, were only too often but outward signs of advanced cardiovascular or neurological disease. Most of the patients in these institutions were homeless with slender family ties or none at all, and it was from them and from the diseased offspring of destitute unmarried mothers, that the 19th century statistics of syphilis mortality were chiefly derived.

In 1915, Dr. T. H. C. Stevenson, superintendent of statistics to the Registrar General, in his evidence before the Royal Commission on Venereal Diseases, stated :—

> Institutional certification is of more value than private. Private suppression is shown by the fact that in deaths from *all* causes, about 20 per cent. are institutional, while in syphilis 40 per cent. are so.

Considerate certification to spare the feelings of the relatives and to avoid jeopardizing the collection of insurance money was, and, to a large extent still is, the rule with the family doctor. Paupers who died in the workhouse hospitals from obvious syphilis, were almost invariably certified as such and it is reasonable to suppose that in the past they formed a high proportion of the total. Though the number of homeless paupers has progressively declined since 1900 the " infirmaries ", to give what were until recently the municipal hospitals their south country title, continued to house many cases of fatal syphilis in their terminal

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stages, for in these institutions were the " chronic " wards to which incurable and incapacitated cases were moved to make room for patients needing curative treatment.

To-day, I think it can be fairly said that certification generally is less inaccurate than it has ever been before, but that it is still far more likely to be accurate in hospitals and institutions where *post-mortem* examinations are more usual and where the next of kin are comparatively unknown to the certifying doctor.

In the earlier treatises on venereal disease, death as a direct result of acquired syphilis is not often mentioned. Lancisi of Naples, however, is said to have been well aware of the syphilitic nature of aneurysms in 1738, though syphilis as a cause of cardiovascular disease was not properly described and understood until the middle of the 19th century, sensed the true aetiology of dementia paralytica and and it was not until its end that Fournier (1899-1906) tabes dorsalis and first referred to these conditions as " les affections parasyphilitiques ".

Generally speaking, acquired syphilis kills in one of two ways, by attacking either the cardiovascular or the nervous system, and, as I have already suggested, it nearly always takes a long time to kill. It is, more often than we appreciate, a hidden disease, and it has been held, mainly in the United States, that more than one half of the persons who acquire syphilis are not treated during the primary and secondary stages, and that others, an unknown quantity, are never treated at all. It seems certain, however, that during a period when large numbers of fresh infections are treated, e.g. 1940-47, there will likewise be a comparatively high incidence of fresh infections, that for one reason or another, go untreated.

There has been much speculation about the fate of the untreated syphilitic and you are doubtless familiar with the results of Bruusgaard's analysis of Boeck's cases who were given no effective treatment for early syphilis between 1891 and 1911 (Bruusgaard, 1929). This series of over 2,000 patients is the only one published in which a large number of primary and secondary cases were followed after receiving no anti-syphilitic treatment. As such it is valuable, but it must be remembered that Boeck diagnosed all his cases on clinical grounds only (without microscopic and serological aids) and it would be suprising if sometimes the diagnosis were not faulty. Syphilis, as well as being a mimic, is also occasionally closely imitated. Also it seems possible that such patients as were subsequently interviewed rather that examined by Bruusgaard, formed a rather selected proportion of the whole. In only a few cases were spinal fluids examined and in no case was cardiac radiography carried out. During the last 2 years the whole material has been carefully restudied by Danbolt, Gjestland, and Clark (1952). Prof. Danbolt has kindly allowed me to quote his " tentative and preliminary conclusions " based on a pilot study of a representative 20 per cent. sample of the original number of patients. These are as follows :

(1) After a period of intensive research the fate of approximately 15 per cent. of the males and 25 per cent. of the females remains unknown.

(2) Of fifty patients known to be living in 1950, the average age of the seventeen males is 68, and of the 33 females 69, the average duration of infection among the living males being 49 years and among the living females 46 years. About half of those known to be alive have already been examined, and of these 16·6 per cent. have evidence of clinical syphilis and 33·2 per cent. are serologically negative with no clinical evidence of syphilis. Of the non-examined patients who are alive and apparently well, all except two are over the age of 60 and half of them are over 70.

(3) Of the total 20 per cent. sample studied and reported on, the following facts are of interest :

(*a*) Evidence of infectious relapse occurred in 17·5 per cent., some weeks or months after their original admission to hospital.

(*b*) Benign late syphilis of skin or bone occurred in 13·5 per cent. (16·4 per cent. males and 11·7 per cent. females).

(*c*) Cardiovascular syphilis (i.e. frank aneurysm or aortic insufficiency) occurred in 8·2 per cent. of males and 7·8 per cent. of females. These proportions appear to be substantiated in subsequent data.

(*d*) Estimates of neurosyphilis from this sample support some of the exceptions made by Harrison (1932) to Bruusgaard's original analysis, in that the rates of neurosyphilis in males and females appear to be as 3 to 1 rather than equal, and that there is some evidence (notably among males and particularly in respect to paresis) that the rates may prove higher than the present sample indicates. This is merely an impression.

These workers conclude :

Thus, based on the 20 per cent. sample, 24·7 per cent. of the males and 18·6 per cent. of the females whose outcome is known developed some form of late symptomatic syphilis. These were not necessarily fatal, since a study of the complete data on each individual indicates that only in 5·5 per cent. of the males and 4·7 per cent. of the females can syphilis be considered the cause of death.

The results of this re-study would seem to support some of the original conclusions of Bruusgaard, and also, I feel, the views of many more recent workers.

Rosahn (1946) at the University of Virginia approached the problem from another angle, and analysed the *post-mortem* reports on 380 known

syphilitics who died between 1917 and 1941, 52 per cent. of whom had never been treated. *Post-mortem* evidence of syphilis was found in 38·9 per cent. of the untreated patients, but only 23·2 per cent. of the total died prematurely as a result of syphilis. No evidence of syphilis was found in 61·1 per cent. of the total, though the blood test was positive in 40·4 per cent. during the last stay in hospital and negative in 17·7 per cent.

Over 35 years ago Sir William Osler (1916) gave evidence before the Royal Commission on Venereal Diseases. He was probably the first physician to state in public that the Registrar General's statistics showing deaths from syphilis were totally inadequate because they did not take into account several groups of diseases in which syphilis was the fundamental cause of death. He listed under this heading premature births, as well as locomotor ataxia, and G.P.I., and he gave it as his opinion that about one-quarter of the deaths from hemiplegia and paraplegia were also due to syphilis. He considered 95 per cent. of aneurysms in persons under 60 years to be due to syphilis, and that syphilis probably came fourth on the list of fatal diseases in 1915, following tuberculosis, cancer, and pneumonia. He agreed that the majority of deaths from syphilis occurred among these with congenital infections, though he recognized that congenital syphilis did not usually cause death late in life.

The enormous group of deaths from hemiplegia, apoplexy, and cerebral embolism totalled 25,000 in 1910, and both Osler and Sir Frederick Mott (1916) thought that one-fourth of them were probably due to syphilis. Osler (1917), in an oration delivered during the campaign against venereal disease which was then in progress, placed syphilis tenth among the killing infections and estimated that, including stillbirths and infantile deaths due to syphilis, the disease caused 60,000 deaths in 1915, more than those from any other infection. Later still Sir Arthur Newsholme (1926) ranked syphilis with cancer, tuberculosis, and pneumonia as one of the four greatest killing diseases. This distinguished epidemiologist went on to qualify his gloomy opinion by saying :

> When deaths from congenital debility, organic heart disease, angina pectoris, diseases of the arteries other than aneurysm, conditions owing their origin wholly or in part to syphilis, are added to the recorded deaths from syphilis.

By the end of the first world war the scheme for the free and confidential treatment of venereal diseases was under way, and it is safe to say that since 1918 an ever increasing proportion of new syphilitic infections have received sufficient treatment to insure the great majority of patients against later lethal effects. The proportion so insured is almost certainly greater in men than in women, as, not only are the early signs of disease less obvious in women and more likely to be overlooked, but during wartime, when the incidence is highest, the majority of infected *men* are in the armed forces and are compulsorily and adequately treated.

This, I think, is the time to consider some relevant figures from the clinics in England and Wales and from the Registrar General's Reports and to give you, rather briefly my comments on them.

Table I shows cases of acquired syphilis of less than one year's duration attending the clinics for the first time. The following points are noteworthy :

(*a*) The steady fall in both male and female new cases down to 1939.

(*b*) The steep rise up to 1946, which would be even steeper, if service cases had been included.

(*c*) The rapid fall in both male and female cases down to 1950, which is continued in 1951, to a record low level, in spite of the re-entry into civil life of large numbers of young men from the services. The female-male ratio of patients treated has progressively improved since 1931.

TABLE I

CASES OF ACQUIRED SYPHILIS, ENGLAND AND WALES, 1931–50

Year	Infection Less than One Year		Infection More than One Year	
	Male	Female	Male	Female
1931	6,421	2,683	3,864	2,705
1932	6,196	2,532	3,924	2,697
1933	5,949	2,141	3,986	2,675
1934	4,888	2,030	3,724*	2,526*
1935	4,226	1,745	3,334*	2,532*
1936	4,033	1,642	3,377	2,392
1937	3,986	1,647	3,175*	2,379*
1938	3,744	1,494	3,368	2,474
1939	3,574	1,412	3,068	2,210
1940	4,029	1,582	2,479	1,871
1941	5,023	2,309	2,215	1,835
1942	5,470	3,576	2,501	2,060
1943	5,159	4,483	2,965	2,416
1944	4,384	4,934	2,699	2,349
1945	5,214	5,527	2,425	2,121
1946	10,705	6,970	2,565	2,256
1947	8,750	5,416	2,420	2,198
1948	6,603	4,034	2,663	2,422
1949	4,392	2,420	2,870	2,600
1950	2,678	1,465	2,844	2,757

*England only.

Table I also shows cases of acquired syphilis of more than one year's duration attending the clinics for the first time. There is a comparatively slow fall in male new cases and an actual rise in the female cases, due doubtless in some part to the growing practice of routine ante-natal blood testing and the referring of positive cases to the clinics. It is also

likely that an increasing awareness of late and latent syphilis may be at work among general practitioners.

Table II shows deaths from general paralysis of the insane, tabes dorsalis, and aneurysm of the aorta (including service personnel). Deaths from aortic aneurysm in males show little significant change and the female deaths seem to be rising fairly consistently. It is of interest that of 642 male and 433 female deaths in 1950, the aneurysms in no less than 212 males and 208 females were certified as non-syphilitic. It is uncertain to what extent, if any, " compassionate " certification is responsible for this high proportion. These figures are especially interesting in view of the often-quoted opinion that aortic aneurysms are four times as common in men than in women.

TABLE II

DEATHS FROM GENERAL PARALYSIS OF THE INSANE, TABES DORSALIS, AND AORTIC ANEURYSM (INCLUDING SERVICE PERSONNEL), ENGLAND AND WALES, 1936–1950

Year	General Paralysis of the Insane		Tabes Dorsalis		Aortic Aneurysm	
	Male	Female	Male	Female	Male	Female
1936	595	204	388	78	786	303
1937	535	233	360	90	757	333
1938	546	202	362	93	757	351
1939	564	183	361	76	689	311
1940	558	195	334	88	687	279
1941	581	184	303	97	658	286
1942	508	166	241	58	643	277
1943	426	159	253	60	603	298
1944	371	134	221	53	583	339
1945	326	133	221	53	592	261
1946	322	127	178	54	668	292
1947	284	116	164	44	679	333
1948	208	66	111	32	645	316
1949	163	65	115	20	684	349
1950	111	56	99	24	642	433*

*Classification of deaths from aortic aneurysm according to the International List (1948) :

Type of Aneurysm	Male	Female
Syphilitic	430	225
Non-syphilitic ..	212	208
Total	642	433

The increasing number of deaths in women would seem to suggest that a far smaller proportion of women than men have been treated in the early stages of infection.

The recent dramatic fall in deaths from parenchymatous neurosyphilis is probably due to the introduction of more effective and less dangerous methods of treatment, e.g. penicillin in general paralysis of the insane and sulphonamides in the infected atonic bladder of tabes. Also the growing practice of routine diagnostic lumbar puncture in late and latent syphilis must have led to the diagnosis, treatment and cure of many cases of neurosyphilis while still in the asymptomatic stage.

Table III shows deaths from disease of the aortic valve *without mitral disease* between the ages of 35 and 80 in 1938 and 1949. The reason for the consistent fall in all age groups is difficult to understand, particularly in the age group 55 to 70, where syphilis might reasonably be assumed to be responsible in a fairly high proportion of cases.

Table III also shows deaths from aneurysm of the aorta between the ages of 35 and 80 in 1938 and 1949. There is a consistent fall in all the age groups over the 11-year period. The numbers considered to be syphilitic by the certifying doctors are not known.

It may or may not be worth mentioning that, in 1939, 770 men and 341 women were certified as having died from other forms of syphilis, and that in 1949 these numbers had fallen to 454 men and 208 women.

Table IV (opposite) shows deaths per 1,000 live births of infants under 1 year certified as due to congenital syphilis. There was a steady fall in the rate, except during three of the war years, and this fall continued during 1945 to 1947, the period of highest incidence of early infectious syphilis.

As all the figures so far mentioned relate to England and Wales, it is interesting to glance at the overall syphilis mortality figures for the United States as estimated by the United States Public Health Service (1950).

TABLE III

DEATHS FROM SPECIFIED DISEASE OF THE HEART IN ENGLAND AND WALES, BY AGE GROUPS, 1938 AND 1949

Cause of Death	Disease of the Aortic Valve without Mitral Disease				Aortic Aneurysm			
Year	1938		1949		1938		1949	
Age Group	Male	Female	Male	Female	Male	Female	Male	Female
35–40	56	19	24	7	47	30	7	11
40–45	96	38	66	13	55	41	30	19
45–50	142	45	83	42	104	47	56	13
50–55	190	90	120	80	161	60	97	32
55–60	280	105	159	61	180	81	135	37
60–65	328	150	160	86	161	72	124	54
65–70	282	127	172	83	103	57	99	74
70–75	168	133	127	86	53	38	81	52
75–80	131	134	57	66	25	45	32	37

TABLE IV

DEATH RATES PER 1,000 LIVE BIRTHS OF INFANTS UNDER 1 YEAR CERTIFIED AS DUE TO CONGENITAL SYPHILIS, ENGLAND AND WALES, 1931–1950

Year	Rate per 1,000	Year	Rate per 1,000
1931	0·45	1941	0·21
1932	0·42	1942	0·19
1933	0·35	1943	0·23
1934	0·30	1944	0·16
1935	0·26	1945	0·15
1936	0·24	1946	0·15
1937	0·19	1947	0·09
1938	0·18	1948	0·09
1939	0·17	1949	0·08
1940	0·16	1950	0·04

Between 1933 and 1939, an average of 20,053 deaths from syphilis occurred each year, a rate of between 15 and 16 per 100,000 of the population. In 1940 this rate began to decline and the fall continued up to 1950, when the number of deaths due to syphilis was estimated to be about 10,000 (7 per 100,000 of the population).

Wright (1951) considers this fall to be particularly meaningful in view of the increasing accuracy in the reporting of deaths due to syphilis since 1939 and that:

> The backlog of undiagnosed late and latent syphilis has been materially exhausted, thereby reducing the size of the reservoir of disability and death.

Though it is difficult to compare the Registrar General's figures with those estimated by the U.S. Public Health Service, it seems likely that the overall fall in mortality from syphilis in the United States has been paralleled by at least as steep a fall in Great Britain.

Table III shows how deaths from general paralysis of the insane in 1950 were about one-fifth of the total in 1939, and those from tabes dorsalis were less than one-third. Taking into consideration the admittedly rather unreliable totals of those who died from "other forms of syphilis" and from "diseases of the aortic valve without mitral disease" (which have fallen considerably in the last 10 years), as well as the death rate from infantile congenital syphilis (which is less than half what it was before the war), even the unsatisfactory aneurysm figures do not spoil the overall picture. It is possible, however, that the advent of penicillin in a heavily-infected community would have a more dramatic impact than on one not so heavily infected, and it is doubtless true that the routine serum testing, carried out in the United States so much more frequently than in Great Britain, must have unmasked large numbers of potentially mortal cases still in the comparatively asymptomatic stage, and prolonged their lives by timely treatment.

I have always believed, in common with many of my colleagues, that the lethal hazards of untreated syphilis, considerable as they are, are not so great as is popularly supposed, and that in the patient who is properly and fairly promptly treated they are minimal. The legacy of undetected syphilis especially among women that follows a war is bound to be large, and at the end of the first world war we heard many gloomy warnings about the fate of those who were treated as well as of those who escaped treatment. These prophecies, as we now know, were never fulfilled. During and since the recent war treatment has been more prompt and thorough, and the education of both the profession and the public has reached a far higher level. It is now towards the women that propaganda should chiefly be directed. The growing practice of routine ante-natal bloodtesting will avert many tragedies, but it seems a pity that a test for syphilis does not yet form part of the routine medical examination of all hospital in-patients and out-patients, of candidates for life insurance, and of those discharged from national service, and premarital blood tests for those who have run risks of infection are also obviously desirable. Yet were these tests compulsory for all, it is doubtful whether the good that might result would not be counterbalanced by a corresponding amount of unjustifiable misery from anomalous reactions. Many of us would agree that we have to "sort out" as many ante-natal doubtful reactors as we have to treat definitely positive cases. This, of course, is no argument against ante-natal blood testing, which I should like to see as a general practice, and it may well be that one day public opinion will demand testing for all before marriage and during pregnancy.

To-day, however, the number of new infections has reached a record low level and, with continued peacetime conditions and vigilance at the ports, (our link with the vast reservoirs of infection overseas), the outlook for the future should be good. Meanwhile, the death-rate from syphilis for the next few decades will depend largely on the discovery and treatment of the thousands who must still be at large in the as yet asymptomatic stages of disease. The tracing of contacts in the early infectious stages is not enough. Fathers and mothers as well as brothers and sisters of congenital cases must be clinically and serologically investigated, as should be the spouses and children of all whose blood tests are found to be positive. Though this in some cases may reopen old wounds and cause distress, it may often enough be a life-saving measure, and it is sometimes the doctor's duty to risk the unpopularity that insistence of such investigations may entail.

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